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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/633,500 | 08/05/2003 | Shye-Lin Wu | BHT-3167-149 | 5214 |

7590 12/01/2004

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| EXAMINER |
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MALSAWMA, LALRINFAMKIM HMAR

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2825

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,500

Applicant(s)

WU, SHYE-LIN

Examiner

Lex Malsawma

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 7, 11 and 12 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities:

At claim 7, line 10, the examiner suggests changing “cell trenches” to “trenches”, otherwise there would be a lack of antecedent basis.

At claim 7, line 17, “acted” should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 7, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchard et al. (6,621,107 B2; hereinafter “**Blanchard**”).

Regarding claims 7, 11 and 12:

Blanchard discloses a power rectifier device, comprising:

a semiconductor substrate 200 (in Fig. 6F) having a first conductive layer doped with first-type impurities (N+), an epi layer 202 formed thereon which is extended to a first surface thereof and is lightly doped (N);

a cathode (not shown) formed on said first conductive layer opposite said first surface (note Col. 6, lines 50-56);

a first oxide layer 203 (Fig. 6B) formed on said first surface;

a pair of trenches (Fig. 6C) formed through said first oxide layer 203 and into a top of said epi-layer 202 and spaced from each other by a first mesa region;

a termination mesa region (i.e., the right-most and left-most mesa regions in Fig. 6C) surrounding said pair of trenches;

a second conductive type doped region 220 (Fig. 7) formed into said epi-layer of said first mesa region and said termination mesa region, wherein said first mesa region and said termination mesa region are regions located on said first surface having said first oxide layer (203/216) formed thereon;

a Schottky barrier platinum-silicide layer (not shown) formed on the epi-layer located on bottom and side surfaces of said trenches (note Col. 8, lines 30-33);

a top metal layer 218 (e.g., TiW/Al, note Col. 8, lines 28-30) formed on said Schottky barrier silicide layer and extended to cover all surfaces of said first mesa region and at least a portion of said termination mesa region.

Blanchard **lacks** specifically stating that the top metal layer acts as an anode; however, in order to acquire a functional rectifier, an anode must exist; and since Blanchard discloses a cathode adjacent the substrate 200 (Col. 6, lines 50-56), it would have been readily obvious to one of ordinary skill in the art to modify Blanchard by specifically reciting that the top metal acts as an anode because Blanchard structure obviously requires (if not inherently requires) the top metal layer to act as an anode. Therefore, these claims are held obvious over the cited references.

Allowable Subject Matter

4. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Remarks

5. Applicant's remarks/arguments have been fully considered, and in reference to Tihanyi and Ueno et al., they are persuasive. However, in reference to Blanchard as applied to claims 7, 11 and 12, the remarks/arguments are not persuasive primarily because Blanchard discloses all essential aspects of the claimed invention, as shown in detail above. Accordingly, claims 7, 11, and 12 stand rejected and claims 8-10 have been determined to contain allowable subject matter.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lex Malsawma whose telephone number is 571-272-1903. The examiner can normally be reached on Mon-Fri (8 hours between 5:30AM and 10:00 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lex Malsawma



November 29, 2004



MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800